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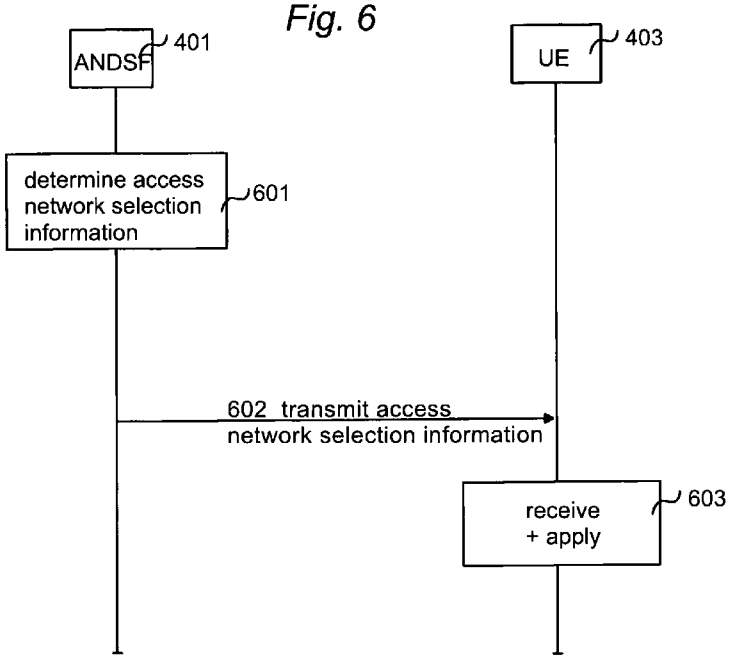
(54) **Title**: ACCESS NETWORK SELECTION IN COMMUNICATIONS SYSTEM

Fig. 6



(57) **Abstract**: A method of access network selection in a multi-access network environment is described. In the method, a network apparatus (401) determines (601) a prioritized access type list for a user equipment (UE), the prioritized access type list comprising information on one or more access technology types that are prioritized. The apparatus (401) also determines (601) a preferred access network list for the user equipment (UE), the preferred access network list comprising information on one or more access networks that are prioritized. The apparatus (401) controls (602) the user equipment (UE) to select an access network that has the highest priority on the preferred access network list of those access networks that are available to the user equipment, which access network utilizes the access type that has the highest priority on the prioritized access type list of those access types that are available to the user equipment.

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ACCESS NETWORK SELECTION IN COMMUNICATIONS SYSTEM

FIELD OF THE INVENTION

The exemplary and non-limiting embodiments of this invention relate generally to wireless communications networks, and more particularly to access network selection.

BACKGROUND ART

The following description of background art may include insights, discoveries, understandings or disclosures, or associations together with disclosures not known to the relevant art prior to the present invention but provided by the invention. Some such contributions of the invention may be specifically pointed out below, whereas other such contributions of the invention will be apparent from their context.

An access network discovery and selection function (ANDSF) refers to a data management and control functionality for providing network discovery and selection assistance data to a user equipment (UE) as per mobile network operators' policy. An ANDSF server is able to initiate and update the assistance data to the user equipment based on network triggers, and respond to requests from the user equipment. The ANDSF server may be located in the subscriber's home operator network and/or in a visited operator network, and the information to access the ANDSF server may be configured on the user equipment or discovered by other means. Push mechanisms enable the ANDSF server to provide assistance information to the user equipment at any time. Pull mechanisms provide the user equipment with a capability to send a request to ANDSF in order to obtain assistance information for access network discovery and selection.

SUMMARY

The following presents a simplified summary of the invention in order to provide a basic understanding of some aspects of the invention. This summary is not an extensive overview of

the invention. It is not intended to identify key elements of the invention or to delineate the scope of the invention. Its sole purpose is to present some concepts of the invention in a simplified form as a prelude to the more detailed description that is presented later.

Various aspects of the invention comprise a method, an apparatus, a user equipment, and a computer-readable storage medium as defined in the independent claims. Further embodiments of the invention are disclosed in the dependent claims.

According to an embodiment of the invention there is provided method of access network selection in a multi-access network environment with a plurality of access networks, the method comprising performing, in a network apparatus, the method steps of determining a prioritized access type list for a user equipment, the prioritized access type list comprising information on one or more access technology types that are prioritized, determining a preferred access network list for the user equipment, the preferred access network list comprising information on one or more access networks that are prioritized, and controlling the user equipment to select an access network that has the highest priority on the preferred access network list of those one or more access networks that are available to the user equipment, which access network utilizes the access type that has the highest priority on the prioritized access type list of those one or more access types that are available to the user equipment.

According to a further embodiment of the invention there is provided a communications system comprising a multi-access network environment with a plurality of access networks, wherein the system is configured to determine a prioritized access type list for a user equipment, the prioritized access type list comprising information on one or more access technology types that are prioritized, determine a preferred access network list for the user equipment, the preferred access network list comprising information on one or more access networks that are prioritized, and control the user equipment to select an access network that has the highest

priority on the preferred access network list of those one or more access networks that are available to the user equipment, which access network utilizes the access type that has the highest priority on the prioritized access type list of those one or more access types that are available to the user equipment.

According to a yet further embodiment of the invention there is provided an apparatus, wherein the apparatus is capable of operating in a multi-access network environment with a plurality of access networks, wherein the apparatus is configured to determine a prioritized access type list for a user equipment, the prioritized access type list comprising information on one or more access technology types that are prioritized, determine a preferred access network list for the user equipment, the preferred access network list comprising information on one or more access networks that are prioritized, and control the user equipment to select an access network that has the highest priority on the preferred access network list of those one or more access networks that are available to the user equipment, which access network utilizes the access type that has the highest priority on the prioritized access type list of those one or more access types that are available to the user equipment.

According to a yet further embodiment of the invention there is provided a user equipment, wherein the user equipment is capable of operating in a multi-access network environment with a plurality of access networks, wherein the user equipment is configured to receive an access network selecting instruction from a network apparatus, and based on said receiving, control the user equipment to select an access network that has the highest priority on a preferred access network list of those one or more access networks that are available to the user equipment, which access network utilizes the access type that has the highest priority on a prioritized access type list of those one or more access types that are available to the user equipment, the prioritized access type list being determined for the user equipment in the network apparatus and comprising information

on one or more access technology types that are prioritized, and the preferred access network list being determined for the user equipment in the network apparatus and comprising information on one or more access networks that are prioritized.

According to a yet further embodiment of the invention there is provided a computer-readable storage medium embodying a program of instructions executable by a processor to perform actions directed toward determining a prioritized access type list for a user equipment, the prioritized access type list comprising information on one or more access technology types that are prioritized, determining a preferred access network list for the user equipment, the preferred access network list comprising information on one or more access networks that are prioritized, and controlling the user equipment to select an access network that has the highest priority on the preferred access network list of those one or more access networks that are available to the user equipment, which access network utilizes the access type that has the highest priority on the prioritized access type list of those one or more access types that are available to the user equipment.

BRIEF DESCRIPTION OF THE DRAWINGS

In the following the invention will be described in greater detail by means of exemplary embodiments with reference to the attached drawings, in which

Figure 1 illustrates an ANDSF managed object according to an exemplary embodiment;

Figure 2 illustrates an ISRP branch of an ANDSF managed object according to an exemplary embodiment;

Figure 3 illustrates a known ANDSF managed object with a known ISRP branch;

Figure 4 shows a simplified block diagram illustrating exemplary system architecture;

Figure 5 shows a simplified block diagram illustrating exemplary apparatuses;

Figure 6 shows a messaging diagram illustrating an exemplary messaging event according to an exemplary embodiment;

Figure 7 shows a schematic diagram of a flow chart according to an exemplary embodiment;
Figure 8 shows a schematic diagram of a flow chart according to another exemplary embodiment.

DETAILED DESCRIPTION OF SOME EMBODIMENTS

Network selection assistance data is organized in form of inter system mobility policies (ISMP) where each policy defines conditions when the policy is valid (e.g. by location or by the time of day), list of prioritized access networks UE considers when selecting access network according to this policy and mutual priority between the policies to resolve a single policy which UE follows in case there are more than one valid policies. This policy is called an active policy. When UE needs network data service it selects an access network with highest priority from the preferred access network list available for the user equipment from the active policy. Preferred access network list may be defined by access type (such as 3GPP, WLAN, WiMAX, 3GPP2) entries or, as disclosed herein, by access network identities such as SSID1, SSID2 for WLAN and NAPID1 for WiMAX. An exemplary preferred access network list may thus include e.g. WLAN-SSID1, WLAN-SSID2, WLAN-xx, 3GPP-yy, WiMAX-NAPID1, WiMAX-zz, 3GPP2-xz (thus the preferred access network list may include information on generic access network technologies like 3GPP, 3GPP2, WLAN and WiMAX identified by 3GPP-yy, WLAN-xx, 3GPP2-xz, WiMAX-zz respectively and/or on specific access networks such as WLAN-SSID1, WLAN-SSID2 and WiMAX-NAPID1 where a specific access network identity is indicated together with the access network technology).

An exemplary embodiment relates to automatic network selection and discovery (ANDSF) mechanisms defined for 3GPP Release 10. ANDSF was already introduced in 3GPP Release 8. ANDSF Release 8 allows a mobile operator to provide its subscriber devices (UE, user equipment) with inter-system mobility policies (ISMP) for automatic, intelligent network selection in a heterogeneous network environment where plurality of different non-3GPP access technologies are

available together with 3GPP, or fulfilling gaps where 3GPP is not available.

ANDSF Release 10 introduces features such as IFOM (IP flow mobility) and MAPCON (multi access PDN connectivity). Both of these features relate to an ability of the user equipment to have simultaneous network connections (such as WLAN and/or 3GPP) to the evolved packet core (EPC). With IFOM, different IP flows may be sent via different access interfaces, while with MAPCON a service associated to a 3GPP PDN connection (as defined by APN) may be routed via specific access. The user equipment UE may, for example, have both a 3GPP connection and a WLAN connection active at the same time. The network operator may require, for example, VoIP traffic to be sent via a specific WLAN network while MMS traffic should be sent via the 3GPP network.

Inter-system routing policy (ISRP) allows the network operator to implement that kind of traffic control. The network operator's ANDSF server and the user equipment (UE) communicate by using OMA device management framework, namely a SyncML (synchronization mark-up language) protocol (XML communication) as HTTP payload over secure-TLS-based connection. ISRP is defined in form of OMA device management object which basically comprises an XML (extensible mark-up language) structure. However, currently specified mechanisms merely lead to inconsistent, cumbersome and flawed implementations.

Currently ANDSF MO comprises three major components: inter system mobility policy, inter system routing policy, and access network discovery information. For an IFOM and/or MAPCON capable user equipment, if inter-system mobility policies and ISRP are available, ISRP is supposed to take precedence for the routing of IP traffic when the device implements IFOM/MAPCON.

ISRP MO comprises a prioritized list of ISRP policies, where each policy may contain list of IFOM and MAPCON policy items. The user equipment selects the highest priority ISRP policy among those which are valid policies. A valid policy refers to a policy which is valid according to its routing criteria,

defined e.g. by user equipment's location and/or time of day criteria. The priority is assigned to the ISRP policy but routing criteria is assigned to a specific IP flow. The same IP flow is also associated to a routing rule which basically defines the preferred access networks for the IP flow. A drawback is that one can easily define policies that are impossible to fulfil. Flow1, for example, may prefer WLAN with SSID=A while Flow2 may prefer WLAN with SSID=B. This is not possible to comply with if both WLAN networks are visible at the same time (devices can be connected to only one network instance of a given technology at a time).

Whole MO is also very complex, having lists of lists of lists. In an exemplary embodiment, the structure is highly simplified, by providing a less complex specification that is easier to understand and implement.

In an exemplary embodiment, the routing criteria and the routing rule are moved away from individual IFOM/MAPCON policies to the ISRP policy. IFOM and MAPCON policies only define a filter (i.e. APN for MAPCON, IP flow mobility filter for IFOM) to match the user payload for the policy and preferred access technology list for the specific IFOM and/or MAPCON policy. This list only selects preferred access technology type or network interface, not the actual access network identity as existing ISRP routing rule definition does. The actual access network is selected based on the routing rule in the ISRP policy. As an example, if ISRP routing rule is a network list [WLAN-SSID1, WLAN-SSID2, WLAN-xx, 3GPP-yy, WiMAX-NAPID1, WiMAX-zz, 3GPP2-xz] and there is IFOM/MAPCON policy indicating a preferred access technology list [WLAN, 3GPP], then this traffic is routed via WLAN-SSID1 when available. If not then WLAN-SSID2 and WLAN-xx are considered, and in absence of them 3GPP-yy. If there is an active IFOM/MAPCON policy indicating preferred access technology WiMAX then WiMAX-NAPID1 and WiMAX-zz networks are considered for it before other access networks, even though the other networks (i.e. WLAN-SSID1, WLAN-SSID2, WLAN-xx, 3GPP-yy) have higher priority in the ISRP routing rule list. ISRP specific routing rule is therefore considered per access

network type. From the ISRP point of view, WLAN networks are mutually prioritized, and WiMAX networks are mutually prioritized.

Other enhancements may also be possible. In an exemplary embodiment, if there is an active ISRP policy but no matching filter for user payload, the data may be routed as follows. Instead of having separate ISMP and ISRP policies they may be combined to one. ISRP policy is thus a part of the ISMP policy. If there is no ISRP filter to catch user payload, then this payload is automatically handled by the active ISMP policy part. ISRP routing criteria is removed as ISMP validity conditions, and time-of-day constraints already take care of it. The ISRP routing rule is modified to include only access technology types, as technology type specific network selection is handled by ISMP prioritized access list. Still the requirements for IFOM/MAPCON are fulfilled.

If desired, Start/EndSourceIPAddress fields in the IFOM filter may be replaced with an APN value, as the ANDSF server does not have knowledge of allocated CareOfAddress (CoA) for the user equipment in case of WLAN access. APN associates to a source IP address, and it is an internal task of the user equipment to convert APN to an actual IP address when composing the IFOM filter for UE's routing layer. The ANDSF server may know well-known APN values.

A user equipment capable of IFOM or MAPCON or both, uses ISRP to route traffic matching the IFOM filter or MAPCON filter (APN) using the preferred access and may also use ISRP to restrict usage of access technologies or access networks for matching traffic. For such traffic ISRP takes precedence over inter-system mobility policies (ISMP). This implies that (only) traffic that doesn't match any of the ISRP filters should be routed according to ISMP.

ANDSF MO currently defines ISRP and ISMP into separate branches. They both have separated routing criteria and routing rules, yet they should be able to work together. Considering, for example, IPTV traffic which matches an IFOM filter IPFLOW_IPTV, there may be another IP flow filter IPFLOW_WEB matching web traffic. If, for example, ISRP's rule

IPFLOW_IPTV prefers WLAN_1 while IPFLOW_WEB prefers WLAN_2 but the ISMP rule prefers WLAN_3. This introduces a dilemma: IFOM or MAPCON traffic cannot be bound to one specific access network because UE can only have one connection for any given access network type. This means that the currently specified structure how to introduce ISRP rules in ANDSF MO is conceptually flawed. UE uses IP flow rules only to select the preferred order of access technology types (WLAN/WiMAX/3GPP/3GPP2). But the specific access network selection is carried out based on ISMP policies as defined in ANDSF MO. For IFOM/MAPCON enabled devices the ISMP prioritized access network list is considered per access technology type. If, for example, IFOM/MAPCON ISRP flow rules prefer WLAN access, then UE selects the highest priority WLAN network in the ISMP preferred access network list available for the UE.

In the current structure it is rather unclear which ISRP rule for IFOM or MAPCON policy is followed. The rule priority is given for ISRP policy but routing criteria is defined for individual IFOM or MAPCON flows. It is unclear whether the device looks for the highest priority ISRP policy which has at least one matching routing criteria for any flow. It seems a sensible ISRP policy repeats the same routing criteria for all flows in the ISRP policy. This is redundant information. UE follows ISMP rules to select preferred access network for given technology. In case there are no ISRP rules or there is traffic which doesn't match with any ISRP rule then this traffic is sent via the most preferred access network available for UE in the active ISMP rule. ISRP rules are used to select preferred access network technology for specific flows defined by the ISRP filters among the ISMP rule. Still it is the ISMP rule which defines the identity of the access network. The usage of start and end source IP addresses in the IFOM IP flow filter is questionable. ANDSF server has no mechanism to be aware of local link addresses or any other address assigned for the device. These addresses in the IFOM IP flow are replaced by an APN value. Operator may have predefined APNs that may be utilized. When UE activates a PDN

connection, it defines APN and this APN gets then associated to a source IP address in the device. Start and end Source IP addresses are replaced by APN.

NonSeamlessOffload may be a valid alternative for IFOM and MAPCON capable devices and therefore the operator is able to define NonSeamlessOffload rules for each IFOM and MAPCON flow separately. The operator may be able to define NonSeamlessOffload rules for traffic not matching any of the IFOM /MAPCON filters and therefore it is possible to define NonSeamlessOffload rules for ISMP policy. The relation between these rules is that the IFOM /MAPCON specific NonSeamlessOffload value in ISRP overrides the NonSeamlessOffload "default value" in ISMP.

Therefore, an exemplary embodiment utilizes ISMP also for ISRP policies. ISRP becomes a branch for ISMP policy and there is no confusion anymore which network UE is to choose. ISMP defines available networks and ISRP is used to choose one of those based on access technology. Due to this branch move, ISRP is placed within a policy and the first <X> selector under it may be deleted.

With this new structure the routing criteria are covered by ISMP and may therefore be removed from the ISRP nodes. Only ISMP routing criteria (validity area/time of day constraints) count, and they are still kept under ISMP. The routing rule merely includes access technology and priority values. The priority values are not changed. The start and end source IP addresses in the IFOM filter are replaced by an optional APN value. UE internally converts APN to source IP address when it builds the routing filter for the device and for HA in case DSMIP is used. NonSeamlessOffload flag is added to every IFOM and MAPCON policy item and also to parent ISMP policy item. An IFOM/MAPCON specific value takes precedence over the parent value.

Currently UE uses the inter-system mobility policy when it can route IP traffic only over a single radio access interface at a given time. UE uses the inter-system routing policies when it can route IP traffic simultaneously over multiple radio access interfaces. This needs to be modified

or one needs to duplicate ISMP structure for ISRP. Currently UE may receive ISMP or ANDI or ISRP information or any combination of these. In an exemplary embodiment ISRP is included into the ISMP but of course ANDSF server may still only update the ISRP part in the existing ISMP policies. ISRP is not independent feature of ISMP but part of it.

IFOM/MAPCON capable UE may request ISRP information in pull mode. UE may initiate the provision of information from the ANDSF, using a client initiated session alert message of code "generic alert". A "type" element of an OMA DM generic alert message is set to "urn:oma:at:ext-3gpp-andsf:1.0:provision". This may be refined such that the "type" element is extended to specify [ISMP/ISRP/ANDI/any combination of these].

Exemplary embodiments of the present invention will now be de-scribed more fully hereinafter with reference to the accompanying drawings, in which some, but not all embodiments of the invention are shown. Indeed, the invention may be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will satisfy applicable legal requirements. Although the specification may refer to "an", "one", or "some" embodiment(s) in several locations, this does not necessarily mean that each such reference is to the same embodiment(s), or that the feature only applies to a single embodiment. Single features of different embodiments may also be combined to provide other embodiments. Like reference numerals refer to like elements throughout.

The present invention is applicable to any user terminal, server, corresponding component, and/or to any communication system or any combination of different communication systems that support access network discovery and selection function. The communication system may be a fixed communication system or a wireless communication system or a communication system utilizing both fixed networks and wireless networks. The protocols used, the specifications of communication systems, servers and user terminals, especially in wireless communication, develop rapidly. Such development may require

extra changes to an embodiment. Therefore, all words and expressions should be interpreted broadly and they are intended to illustrate, not to restrict, the embodiment.

In the following, different embodiments will be described using, as an example of a system architecture whereto the embodiments may be applied, without restricting the embodiment to such an architecture, however.

Figure 1 illustrates ANDSF MO according to an exemplary embodiment. Figure 2 illustrates an ISRP part in ANDSF MO according to an exemplary embodiment. Figure 3 illustrates current ANDSF MO with an original ISRP branch. The ISRP part in ANDSF MO is greatly simplified as can be seen in the figures. The ellipse in Figure 1 shows where modifications were made in ANDSF MO. In practise, ISRP MO has been moved from the top level under a policy MO. The ISRP branch is moved under policy element. The exemplary ISRP MO may also include few additional modifications for optimal usage, but they are not essential here. NonSeamlessOffload is also a Release 10 feature, which allows the user equipment to offload traffic directly to used WLAN access. This traffic is sent by using local CoA, and the traffic is not routed via EPC. The mechanism as shown in Figure 2 may allow the policy to include a Boolean indication whether nonSeamlessOffload is desired when the policy is enforced. If the device supports IFOM or MAPCON, then the IFOM/MAPCON specific nonSeamlessOffload values override the nonSeamlessOffload value in the non-ISRP part. IFOM policy in ANDSF MO is indicated by a single ISRP/ForFlowBased/<X> item and MAPCON policy by a single ISRP/ForServiceBased/<X> item. Since the exemplary ISRP is proposed to be part of the inter-system mobility policy, there is no need for additional <X> level under the ISRP entity. Figure 2 represents an exemplary ISRP MO which is essentially different from the original ISRP MO which is present in Figure 3. By means of the exemplary embodiment, confusion how to route data in a multi-access network environment with a plurality of access networks, may be avoided.

With reference to Figure 4, let us examine an example of a radio system to which embodiments of the invention can be applied. In this example, the radio system is based on LTE network elements. However, the invention described in these examples is not limited to the LTE radio systems but can also be implemented in other radio systems, such as UMTS (universal mobile telecommunications system), GSM, EDGE, WCDMA, bluetooth network, WLAN or other mobile or wireless network. In an embodiment, the presented solution may be applied between user equipment belonging to different but compatible systems such as LTE and UMTS.

A general architecture of a communication system is illustrated in Figure 4. Figure 4 is a simplified system architecture only showing some elements and functional entities, all being logical units whose implementation may differ from what is shown. The connections shown in Figure 4 are logical connections; the actual physical connections may be different. It is apparent to a person skilled in the art that the systems also comprise other functions and structures. It should be appreciated that the functions, structures, elements, and protocols used in or for wireless communication are irrelevant to the actual invention. Therefore, they need not be discussed in more detail here.

The exemplary radio system of Figure 1 comprises a core network 402 of a home network operator, the network 402 comprising a core network node 401. The core network node 401 may include e.g. an access network discovery and selection function (ANDSF), MSC server (MSS), serving GPRS support node, mobility management entity (MME), home location register (HLR), home subscriber server (HSS), visitor location register (VLR) or any other core network element or a combination of core network elements. The core network node 401 is capable connecting to one or more access networks 411, 421, 422, 431, 432 utilizing an access technology (access type). The core network node 103 may be connected to the access network 411, 421, 422, 431, 432 e.g. via a radio network controller or directly via a connection 404. In Figure 4, a situation is shown where the access network 411

utilizes 3GPP access technology, the access network 415 utilizes 3GPP2 access technology the access networks 421, 422, 423 utilize WLAN access technology, and the access networks 431, 432 utilize WiMAX access technology. Figure 4 shows a user equipment 403 located in the service area of an access network 411, 415, 421, 422, 423, 431, 432. The user equipment refers to a portable computing device, and it may also be referred to as a user terminal. Such computing devices include wireless mobile communication devices operating with or without a subscriber identification module (SIM), including, but not limited to, the following types of devices: mobile phone, smart-phone, personal digital assistant (PDA), handset, laptop computer. In the example situation of Figure 4, the user equipment 403 is capable of connecting to an access network 411, 415, 421, 422, 423, 431, 432 via a connection 405. The core network node 401 and the user equipment 403 are capable of connecting to each other via an access network 411, 415, 421, 422, 423, 431, 432 via connections 404, 405. Figure 4 shows a situation where UE is connected to the core network via access network 421 (via connections 405, 404).

Figure 4 only illustrates a simplified example. In practice, the net-work may include more base stations and radio network controllers, and more cells may be formed by the base stations. The networks of two or more opera-tors may overlap, the sizes and form of the cells may vary from what is de-picted in Figure 4, etc. The communication system may also be able to communicate with other networks, such as a public switched telephone network. The embodiments are not, however, restricted to the network given above as an example, but a person skilled in the art may apply the solution to other communication networks provided with the necessary properties. For example, the connections between different network elements may be realized with internet protocol (IP) connections.

Figure 5 illustrates examples of apparatuses according to embodiments of the invention. Figure 5 shows a user equipment 403 located in the area of the base station or eNB 501. The

user equipment is configured to be in connection with the base station 501. The user equipment or UE 403 comprises a controller 502 operationally connected to a memory 503 and a transceiver 504. The controller 502 controls the operation of the user equipment 403. The memory 503 is configured to store software and data. The transceiver 504 is configured to set up and maintain a wireless connection to the base station 501. The transceiver is operationally connected to a set of antenna ports 505 connected to an antenna arrangement 506. The antenna arrangement 506 may comprise a set of antennas. The number of antennas may be one to four, for example. The number of antennas is not limited to any particular number. The user equipment 403 may also comprise various other components, such as a user interface, camera, and media player. They are not displayed in the figure due to simplicity. The base station or eNB 501 comprises a controller 507 operationally connected to an interface 508 and a transceiver 509. The controller 507 controls the operation of the base station 501. The interface 508 is configured to setup and maintain the connection with a network element 401. The transceiver 509 is configured to set up and maintain a wireless connection to the user equipment 403 within the service area of the base station 501. The transceiver 209 is operationally connected to an antenna arrangement 510. The antenna arrangement may comprise a set of antennas. The number of antennas may be two to four, for example. The number of antennas is not limited to any particular number. The base station is operationally connected (directly or indirectly) to a network element 401 of the communication system. The network element 401 may be an access network discovery and selection function (ANDSF), MSC server (MSS), serving GPRS support node, mobility management entity (MME), home location register (HLR), home subscriber server (HSS), visitor location register (VLR), a radio network controller (RNC), a gateway, or a server, for example. The network element or ANDSF 401 may comprise a controller 511 and a memory 512 configured to store software

and data and an interface 513 configured to be in connection 404 with the base station.

The embodiments are not, however, restricted to the network given above as an example, but a person skilled in the art may apply the solution to other communication networks provided with the necessary properties. For example, the connections between different network elements may be realized with internet protocol (IP) connections.

The memory may include volatile and/or non-volatile memory and typically stores content, data, or the like. For example, the memory may store computer program code such as software applications (for example for the detector unit and/or for the adjuster unit) or operating systems, information, data, content, or the like for the processor to perform steps associated with operation of the apparatus in accordance with embodiments. The memory may be, for example, random access memory (RAM), a hard drive, or other fixed data memory or storage device. Further, the memory, or part of it, may be removable memory detachably connected to the apparatus.

The techniques described herein may be implemented by various means so that an apparatus implementing one or more functions of a corresponding mobile entity described with an embodiment comprises not only prior art means, but also means for implementing the one or more functions of a corresponding apparatus described with an embodiment and it may comprise separate means for each separate function, or means may be configured to perform two or more functions. For example, these techniques may be implemented in hardware (one or more apparatuses), firmware (one or more apparatuses), software (one or more modules), or combinations thereof. For a firmware or software, implementation can be through modules (e.g., procedures, functions, and so on) that perform the functions described herein. The software codes may be stored in any suitable, processor/computer-readable data storage medium(s) or memory unit(s) or article(s) of manufacture and executed by one or more processors/computers. The data storage medium or the memory unit may be implemented within the processor/computer or external to the processor/computer,

in which case it can be communicatively coupled to the processor/computer via various means as is known in the art. User equipment may refer to any user communication device. A term "user equipment" as used herein may refer to any device having a communication capability, such as a wireless mobile terminal, a PDA, a smart phone, a personal computer (PC), a laptop computer, a desktop computer, etc. For example, the wireless communication terminal may be an UMTS or GSM/EDGE smart mobile terminal. Thus, the application capabilities of the device according to various embodiments of the invention may include native applications available in the terminal, or subsequently installed applications. The messaging service center may be implemented in any network element, such as a server.

Figure 5 is a block diagram of an apparatus according to an embodiment of the invention. Although the apparatus has been depicted as one entity, different modules and memory may be implemented in one or more physical or logical entities. The functionality of the network element 401 is described in more detail below with Figures 6 to 8. It should be appreciated that the apparatus 401 may comprise other units used in or for access network selection. However, they are irrelevant to the actual invention and, therefore, they need not to be discussed in more detail here.

The apparatus may also be a user terminal which is a piece of equipment or a device that associates, or is arranged to associate, the user terminal and its user with a subscription and allows a user to interact with a communications system. The user terminal presents information to the user and allows the user to input information. In other words, the user terminal may be any terminal capable of receiving information from and/or transmitting in-formation to the network, connectable to the network wirelessly or via a fixed connection. Examples of the user terminal include a personal computer, a game console, a laptop (a notebook), a personal digital assistant, a mobile station (mobile phone), and a line telephone.

The apparatus 401 may generally include a processor, controller, control unit or the like connected to a memory and to various interfaces of the apparatus. Generally the processor is a central processing unit, but the processor may be an additional operation processor. The processor may comprise a computer processor, application-specific integrated circuit (ASIC), field-programmable gate array (FPGA), and/or other hardware components that have been programmed in such a way to carry out one or more functions of an embodiment.

The techniques described herein may be implemented by various means so that an apparatus implementing one or more functions of a corresponding mobile entity described with an embodiment comprises not only prior art means, but also means for implementing the one or more functions of a corresponding apparatus described with an embodiment and it may comprise separate means for each separate function, or means may be configured to perform two or more functions. For example, these techniques may be implemented in hardware (one or more apparatuses), firmware (one or more apparatuses), software (one or more modules), or combinations thereof. For a firmware or software, implementation can be through modules (e.g., procedures, functions, and so on) that perform the functions described herein. The software codes may be stored in any suitable, processor/computer-readable data storage medium(s) or memory unit(s) or article(s) of manufacture and executed by one or more processors/computers. The data storage medium or the memory unit may be implemented within the processor/computer or external to the processor/computer, in which case it can be communicatively coupled to the processor/computer via various means as is known in the art.

The signaling chart of Figure 6 illustrates the required signaling. In the example of Figure 6, a network apparatus 401, which may comprise e.g. an access network discovery and selection function (ANDSF), determines, in step 601, access network selection information for a user terminal (user equipment UE). This means that a prioritized access type list is determined 601 for the user terminal 403. The prioritized

access type list comprises information on access network technology types (e.g. WLAN, WiMAX, 3GPP) that are prioritized. A preferred access network list is also determined 601 for the user terminal 403. The preferred access network list comprises information on one or more access networks (e.g. 3GPP-yy, WLAN-SSID1, WLAN-SSID2, WLAN-xx, WiMAX-NAPID1, WiMAX-zz, 3GPP2-xz) that are prioritized. The apparatus is configured to control the user terminal 403 to select an access network (e.g. WLAN-SSID1) that has the highest priority on the preferred access network list and being available to the user equipment among those one or more access networks (e.g. WLAN-SSID1, WLAN-SSID2, WLAN-xx) utilizing the access type (e.g. WLAN) having the highest priority on the prioritized access type list and being available to the user equipment. Thus the apparatus 401 is configured to transmit 601, to the user terminal 403, access network selection information. This means that an access network selecting instruction is transmitted 602 to the user terminal 403 for controlling the user equipment 403 to use said access network (WLAN-SSID1) for the specified IP payload generated in the user equipment or received by the user equipment. In step 603 the user terminal 403 receives the access network selecting instruction from the apparatus 401 and applies the instruction by starting to use the selected access network. Thus the availability (e.g. the user equipment is able to connect to this network in its current position) of the network can be taken into account in the user equipment: if the highest priority access network and/or highest priority access technology is not detected or such a network/technology is not allowed then the next highest priority access technology in the prioritized access type list and/or next highest priority access network is tried. This is repeated until an available access network can be connected, or there are no more technologies to try in the prioritized access type list. If there are no networks to try in the preferred access network list either, then the behaviour may be UE dependent.

The determination of the prioritized access type list (for each IFOM/MAPCON application) may be carried out before or after the determination of the preferred access network list. The prioritized access type list may be included within the access network policy. The prioritized access type list is matched against available preferred access networks. Access networks unavailable for UE are ignored during selection. Highest priority access type from prioritized access type list, which is found from available preferred access networks, is selected. In an embodiment, the apparatus 401 is aware of the availability of the access networks and/or access types to the user equipment. Thus the availability may be checked in the user equipment and matched against the prioritized access type list and the preferred access network list provided by the apparatus 401 in order to select the access network. An access type may be considered available to the user equipment if an access network utilizing said access type is available to the user equipment.

It should noted that the message 602 may be transmitted via an access network where the user terminal is currently connected, wherein the receipt of the message 602 in the user terminal may lead to a change of the access network used by the user terminal as the user terminal follows the access network selecting instruction transmitted by the apparatus 401.

It should be noted that the access technologies WLAN, WiMAX, 3GPP 3GPP2 and the access networks WLAN-SSID1, WLAN-SSID2, WLAN-xx, WiMAX-NAPID1, WiMAX-zz, 3GPP-yy, 3GPP2-xz and their order of priority as disclosed herein are only exemplary and the present solution is not limited to these access technologies and/or access networks. Instead, the present solution is applicable to any access network/access technology capable of utilizing network discovery and selection data. Some of the access technologies and/or access networks may also be left out.

In an exemplary embodiment, the prioritized access type list and/or the preferred access network list may be used to indicate an access type/access network that the user

equipment is supposed not to use in any case. Thus, the apparatus may be able to control the user equipment not to select a specific access type/access network, by means of the status of the access type/access network on the prioritized access type list/the preferred access network list.

Figure 7 is a flow chart illustrating an exemplary embodiment. The 401, which may comprise e.g. an access network discovery and selection function (ANDSF), is configured to determine access network selection information for a user terminal (user equipment UE). This means that a prioritized access type list is determined, in step 701, for the user terminal 403. The prioritized access type list comprises information on access network technology types (e.g. WLAN, WiMAX, 3GPP) that are prioritized. A preferred access network list is also determined, in step 702, for the user terminal 403. The preferred access network list comprises information on one or more access networks (e.g. 3GPP-yy, WLAN-SSID1, WLAN-SSID2, WLAN-xx, WiMAX-NAPID1, WiMAX-zz, 3GPP2-xz) that are preferred. The apparatus is configured to control, in step 703, the user terminal 403 to select an access network (e.g. WLAN-SSID1) that has the highest priority on the preferred access network list and being available to the user equipment among those one or more access networks (e.g. WLAN-SSID1, WLAN-SSID2, WLAN-xx) utilizing the access type (e.g. WLAN) having the highest priority on the prioritized access type list and being available to the user equipment. The apparatus 401 is configured to transmit, in step 703, to the user terminal 403, access network selection information. This means that an access network selecting instruction is transmitted 703 to the user terminal 403 for controlling the user equipment 403 to select and use said access network (WLAN-SSID1) as described above.

Figure 8 is a flow chart illustrating an exemplary embodiment. The user terminal (user equipment UE) is configured to receive, in step 801, access network selection information from a network apparatus 401. This means that the user terminal 403 receives the access network selecting

instruction (as described above) from the apparatus 401. In order to select the access network for UE, the user equipment may check the availability of the access types/access networks, and match them (in the order of priority) against the prioritized access type list and the preferred access network list provided by the apparatus 401. (An access type may be considered available to the user equipment if an access network utilizing said access type is available to the user equipment). In step 802, the user terminal applies the instruction by starting to use the selected access network. Thus, according to an exemplary embodiment, there is provided a method comprising performing, in a network apparatus, the method steps of determining a prioritized access type list for a user equipment, the prioritized access type list comprising information on one or more access technology types that are prioritized, determining a preferred access network list for the user equipment, the preferred access network list comprising information on one or more access networks that are prioritized, and controlling the user equipment to select an access network that has the highest priority on the preferred access network list of those one or more access networks that are available to the user equipment, which access network utilizes the access type that has the highest priority on the prioritized access type list of those one or more access types that are available to the user equipment. According to another exemplary embodiment, there is provided a communications system configured to determine a prioritized access type list for a user equipment, the prioritized access type list comprising information on one or more access technology types that are prioritized, determine a preferred access network list for the user equipment, the preferred access network list comprising information on one or more access networks that are prioritized, and control the user equipment to select an access network that has the highest priority on the preferred access network list of those one or more access networks that are available to the user equipment, which access network utilizes the access type that has the highest priority on the prioritized access type list

of those one or more access types that are available to the user equipment.

According to a yet another exemplary embodiment, there is provided an apparatus configured to determine a prioritized access type list for a user equipment, the prioritized access type list comprising information on one or more access technology types that are prioritized, determine a preferred access network list for the user equipment, the preferred access network list comprising information on one or more access networks that are prioritized, and control the user equipment to select an access network that has the highest priority on the preferred access network list of those one or more access networks that are available to the user equipment, which access network utilizes the access type that has the highest priority on the prioritized access type list of those one or more access types that are available to the user equipment.

According to a yet another exemplary embodiment, there is provided a user equipment configured to receive an access network selecting instruction from a network apparatus, and based on said receiving, control the user equipment to select an access network that has the highest priority on a preferred access network list of those one or more access networks that are available to the user equipment, which access network utilizes the access type that has the highest priority on a prioritized access type list of those one or more access types that are available to the user equipment, the prioritized access type list being determined for the user equipment in the network apparatus and comprising information on one or more access technology types that are prioritized, and the preferred access network list being determined for the user equipment in the network apparatus and comprising information on one or more access networks that are prioritized.

According to a yet another exemplary embodiment, there is provided a computer-readable storage medium embodying a program of instructions executable by a processor to perform actions directed toward determining a prioritized access type

list for a user equipment, the prioritized access type list comprising information on one or more access technology types that are prioritized, determining a preferred access network list for the user equipment, the preferred access network list comprising information on one or more access networks that are prioritized, and controlling the user equipment to select an access network that has the highest priority on the preferred access network list of those one or more access networks that are available to the user equipment, which access network utilizes the access type that has the highest priority on the prioritized access type list of those one or more access types that are available to the user equipment.

In yet another exemplary embodiment, the apparatus 401 transmits an access network selecting instruction to the user equipment UE for controlling the user equipment UE to use said access network selected in the apparatus for the user equipment UE.

In yet another exemplary embodiment, the prioritized access type list is determined on the basis of the location of the user equipment in the multi-access network environment.

In yet another exemplary embodiment, the preferred access network list is determined on the basis of the location of the user equipment UE in the multi-access network environment.

In yet another exemplary embodiment, the prioritized access type list is determined based on time of the day criteria.

In yet another exemplary embodiment, the preferred access network list is determined based on time of the day criteria.

In yet another exemplary embodiment, an access network discovery and selection function (ANDSF) managed object is defined such that the prioritized access type list and preferred access network list are applied as a part of an inter-system routing policy (ISRP).

In yet another exemplary embodiment, defining an access network discovery and selection function (ANDSF) managed object is defined such that an inter-system routing policy (ISRP) is applied as a part of an inter-system mobility policy.

The steps/points, signalling messages and related functions de-scribed above in Figures 1 to 8 are in no absolute chronological order, and some of the steps/points may be performed simultaneously or in an order differing from the given one. Other functions can also be executed between the steps/points or within the steps/points and other signalling messages sent between the illustrated messages. Some of the steps/points or part of the steps/points can also be left out or replaced by a corresponding step/point or part of the step/point. The apparatus operations illustrate a procedure that may be implemented in one or more physical or logical entities. The signalling messages are only exemplary and may even comprise several separate messages for transmitting the same information. In addition, the messages may also contain other information.

It will be obvious to a person skilled in the art that, as the technology advances, the inventive concept can be implemented in various ways. The invention and its embodiments are not limited to the examples described above but may vary within the scope of the claims.

List of abbreviations

ANDSF access network discovery and selection function
IFOM IP flow mobility
ISMP inter-system mobility policy
ISRP inter-system routing policy
MAPCON multi access PDN connectivity
PDN packet data network
OMA open mobile alliance
PLMN public land mobile network
MO managed object
EPC evolved packet core
APN access point name
MMS multimedia messaging service
VoIP voice over IP
IP internet protocol
TLS transport layer security protocol
HTTP hypertext transfer protocol

3GPP 3rd generation partnership project
WiMAX worldwide interoperability for microwave access
WLAN wireless local area network
SyncML synchronization mark-up language
XML extensible mark-up language

CLAIMS

1. A method of access network selection in a multi-access network environment with a plurality of access networks, the method comprising performing, in a network apparatus (ANDSF), the method steps of

determining (601, 701) a prioritized access type list for a user equipment (UE), the prioritized access type list comprising information on one or more access technology types that are prioritized;

determining (601, 702) a preferred access network list for the user equipment (UE), the preferred access network list comprising information on one or more access networks that are prioritized;

controlling (602, 703) the user equipment (UE) to select an access network that has the highest priority on the preferred access network list of those one or more access networks that are available to the user equipment, which access network utilizes the access type that has the highest priority on the prioritized access type list of those one or more access types that are available to the user equipment.

2. A method as claimed in claim 1, wherein the method comprises transmitting (602, 703) an access network selecting instruction to the user equipment (UE) for controlling the user equipment (UE) to use said access network for IP payload traffic generated in the user equipment and/or received in the user equipment (UE).

3. A method as claimed in claim 1 or 2, wherein the prioritized access type list is determined on the basis of the location of the user equipment (UE) in the multi-access network environment.

4. A method as claimed in claim 1, 2 or 3, wherein the preferred access network list is determined on the basis of the location of the user equipment (UE) in the multi-access network environment.

5. A method as claimed in any of claims 1 to 4, wherein the prioritized access type list is determined based on time of the day criteria.

6. A method as claimed in any of claims 1 to 5, wherein the preferred access network list is determined based on time of the day criteria.

7. A method as claimed in any of claims 1 to 6, wherein the method comprises defining an access network discovery and selection function (ANDSF) managed object such that the prioritized access type list and preferred access network list are applied as a part of an inter-system routing policy (ISRP).

8. A method as claimed in any of claims 1 to 7, wherein the method comprises defining an access network discovery and selection function (ANDSF) managed object such that an inter-system routing policy (ISRP) is applied as a part of an inter-system mobility policy.

9. A communications system comprising a multi-access network environment with a plurality of access networks, wherein the system is configured to
determine a prioritized access type list for a user equipment (UE), the prioritized access type list comprising information on one or more access technology types that are prioritized;
determine a preferred access network list for the user equipment (UE), the preferred access network list comprising information on one or more access networks that are prioritized;
control the user equipment (UE) to select an access network that has the highest priority on the preferred access network list of those one or more access networks that are available to the user equipment, which access network utilizes the access type that has the highest priority on the prioritized access type list of those one or more access types that are available to the user equipment.

10. An apparatus, wherein the apparatus (ANDSF) is capable of operating in a multi-access network environment with a plurality of access networks, wherein the apparatus (ANDSF) is configured to
determine a prioritized access type list for a user equipment (UE), the prioritized access type list comprising information on one or more access technology types that are prioritized;

determine a preferred access network list for the user equipment (UE), the preferred access network list comprising information on one or more access networks that are prioritized;

control the user equipment (UE) to select an access network that has the highest priority on the preferred access network list of those one or more access networks that are available to the user equipment, which access network utilizes the access type that has the highest priority on the prioritized access type list of those one or more access types that are available to the user equipment.

11. An apparatus as claimed in claim 10, wherein the apparatus (ANDSF) is configured to transmit an access network selecting instruction to the user equipment (UE) for controlling the user equipment (UE) to use said access network for IP payload traffic generated in the user equipment and/or received in the user equipment (UE).

12. An apparatus as claimed in claim 10 or 11, wherein the apparatus (ANDSF) is configured to determine the prioritized access type list on the basis of the location of the user equipment (UE) in the multi-access network environment.

13. An apparatus as claimed in claim 10, 11 or 12, wherein the apparatus (ANDSF) is configured to determine the preferred access network list on the basis of the location of the user equipment (UE) in the multi-access network environment.

14. An apparatus as claimed in any of claims 10 to 13, wherein the apparatus (ANDSF) is configured to determine the prioritized access type list based on time of the day criteria.

15. An apparatus as claimed in any of claims 10 to 14, wherein the apparatus (ANDSF) is configured to determine the preferred access network list based on time of the day criteria.

16. An apparatus as claimed in any of claims 10 to 15, wherein the apparatus (ANDSF) is configured to define an access network discovery and selection function (ANDSF) managed object such that the prioritized access type list and

preferred access network list are applied as a part of an inter-system routing policy (ISRP).

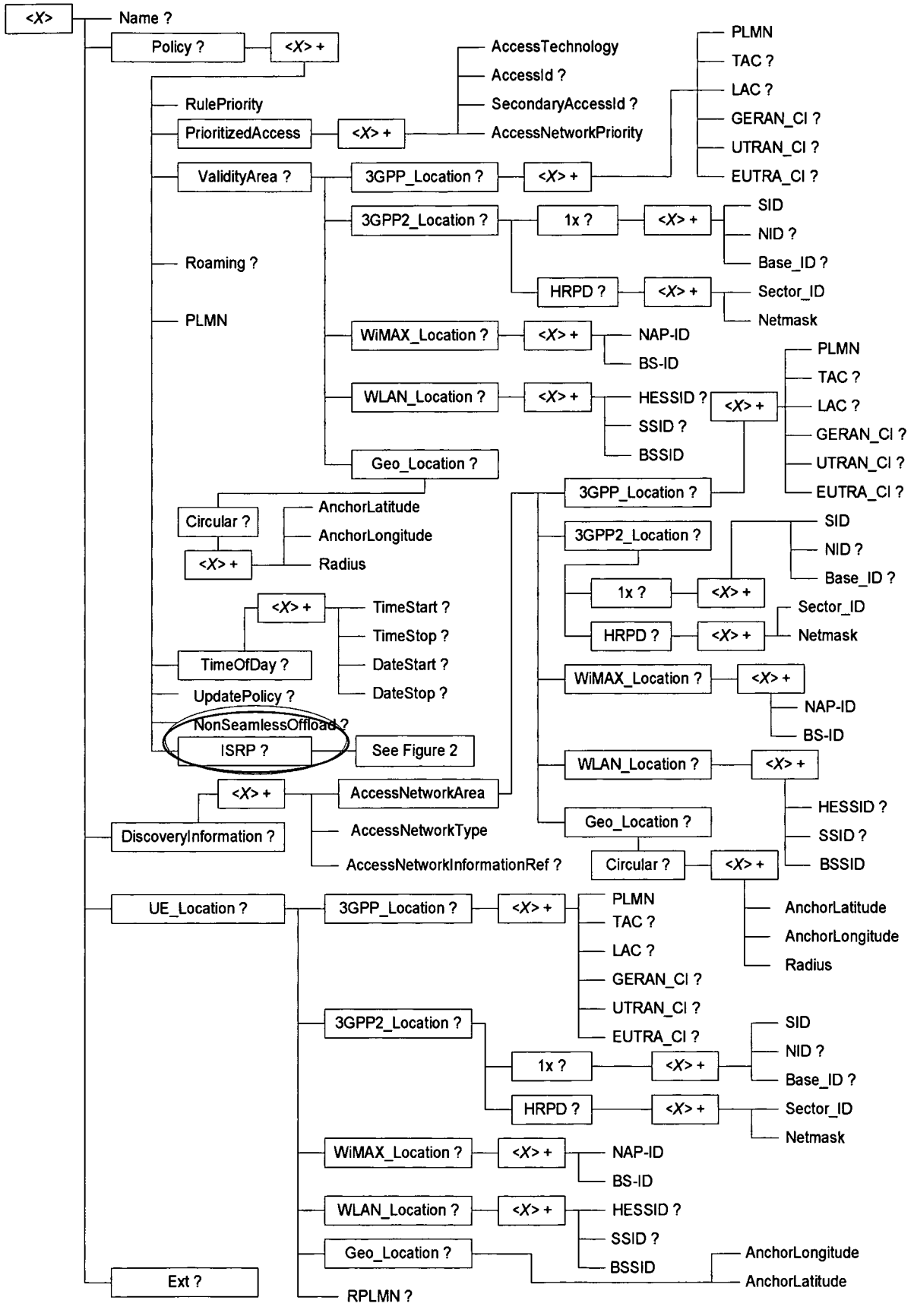
17. An apparatus as claimed in any of claims 10 to 16, wherein the apparatus (ANDSF) is configured to define an access network discovery and selection function (ANDSF) managed object such that an inter-system routing policy (ISRP) is applied as a part of an inter-system mobility policy.

18. A user equipment, wherein the user equipment (UE) is capable of operating in a multi-access network environment with a plurality of access networks, wherein the user equipment (UE) is configured to
receive an access network selecting instruction from a network apparatus (ANDSF); and
based on said receiving, control the user equipment (UE) to select an access network that has the highest priority on a preferred access network list of those one or more access networks that are available to the user equipment, which access network utilizes the access type that has the highest priority on a prioritized access type list of those one or more access types that are available to the user equipment, the prioritized access type list being determined for the user equipment (UE) in the network apparatus and comprising information on one or more access technology types that are prioritized, and the preferred access network list being determined for the user equipment (UE) in the network apparatus and comprising information on one or more access networks that are prioritized.

19. A computer-readable storage medium embodying a program of instructions executable by a processor to perform actions directed toward
determining a prioritized access type list for a user equipment (UE), the prioritized access type list comprising information on one or more access technology types that are prioritized;
determining a preferred access network list for the user equipment (UE), the preferred access network list comprising

information on one or more access networks that are prioritized;

controlling the user equipment (UE) to select an access network that has the highest priority on the preferred access network list of those one or more access networks that are available to the user equipment, which access network utilizes the access type that has the highest priority on the prioritized access type list of those one or more access types that are available to the user equipment.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DateStop ?
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Fig. 1

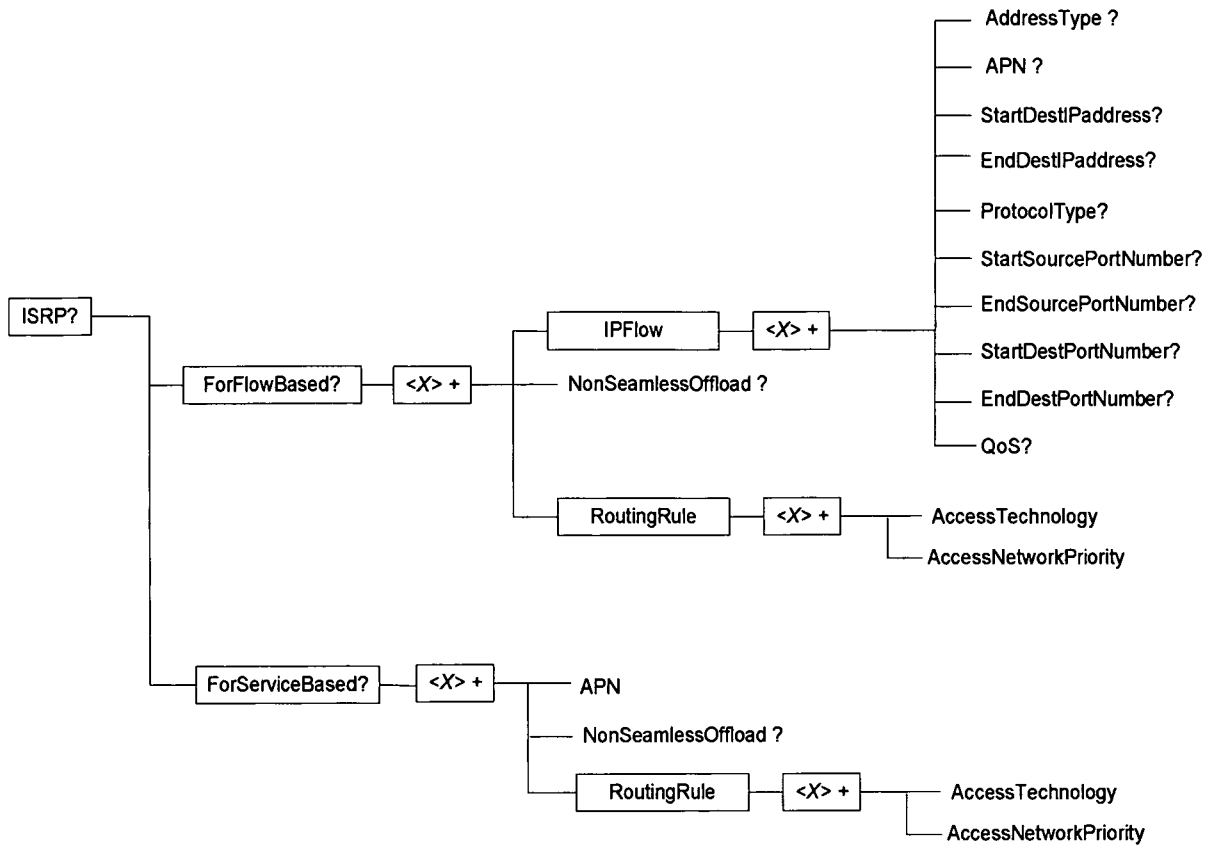
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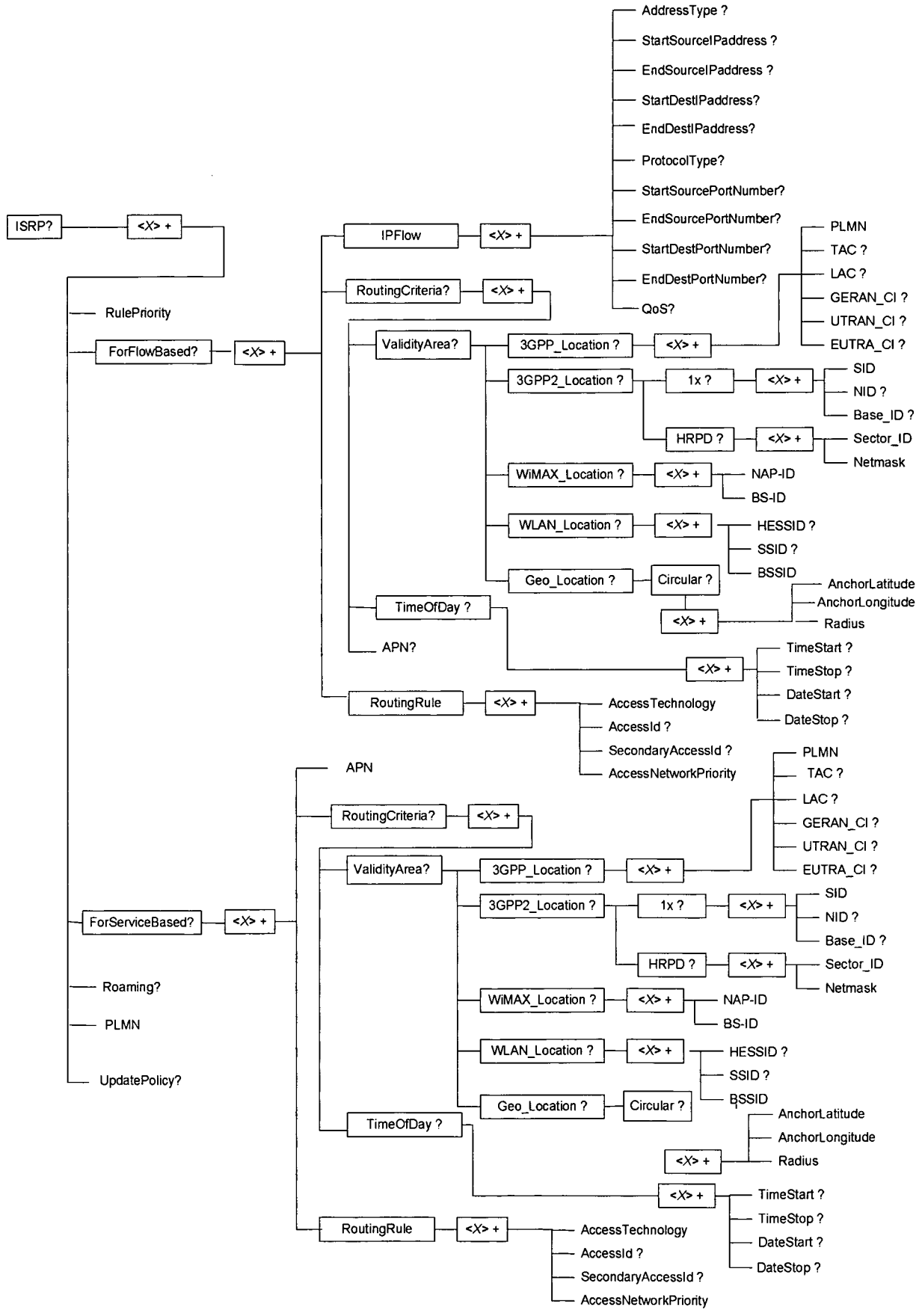
Fig. 2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EUTRA_CI ?
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HRPD ?
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Sector_ID
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BS-ID
WLAN_Location ?
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SSID ?
BSSID
Geo_Location ?
Circular ?
AnchorLatitude
AnchorLongitude
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Radius
TimeOfDay ?
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TimeStart ?
TimeStop ?
DateStart ?
DateStop ?
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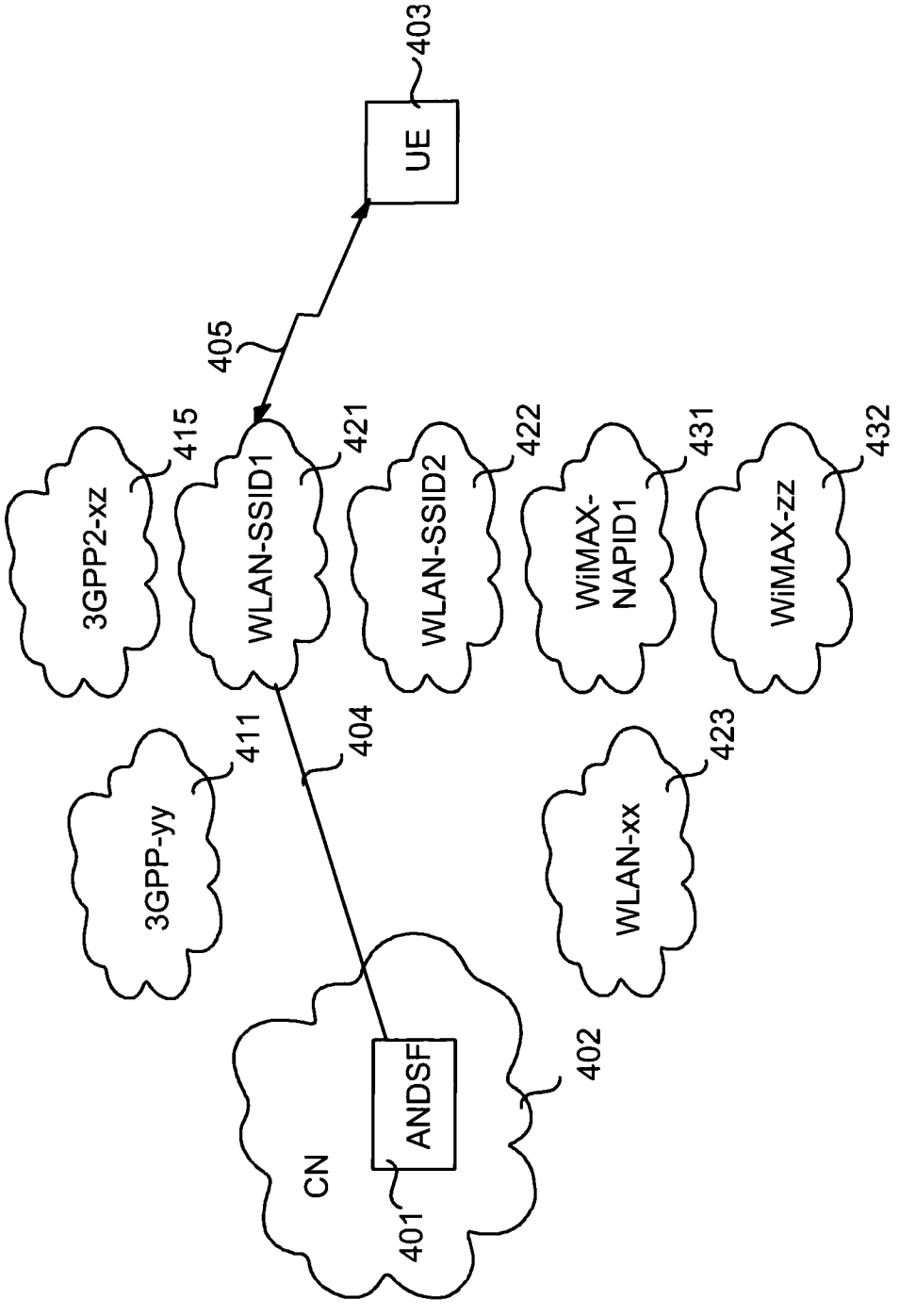
AccessId ?
SecondaryAccessId ?
AccessNetworkPriority
Roaming?
PLMN
UpdatePolicy?

Fig. 3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421
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422
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404
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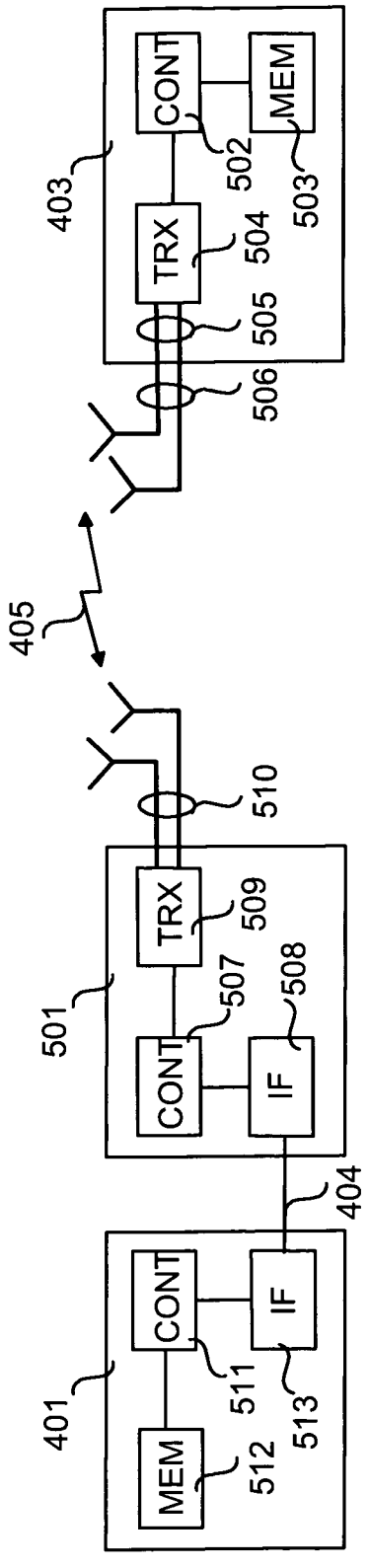
ANDSF
401
402

Fig. 4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CONT
IF
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512
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404
501
CONT
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TRX
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CONT
MEM
TRX
502
503
504
505
506

Fig. 5

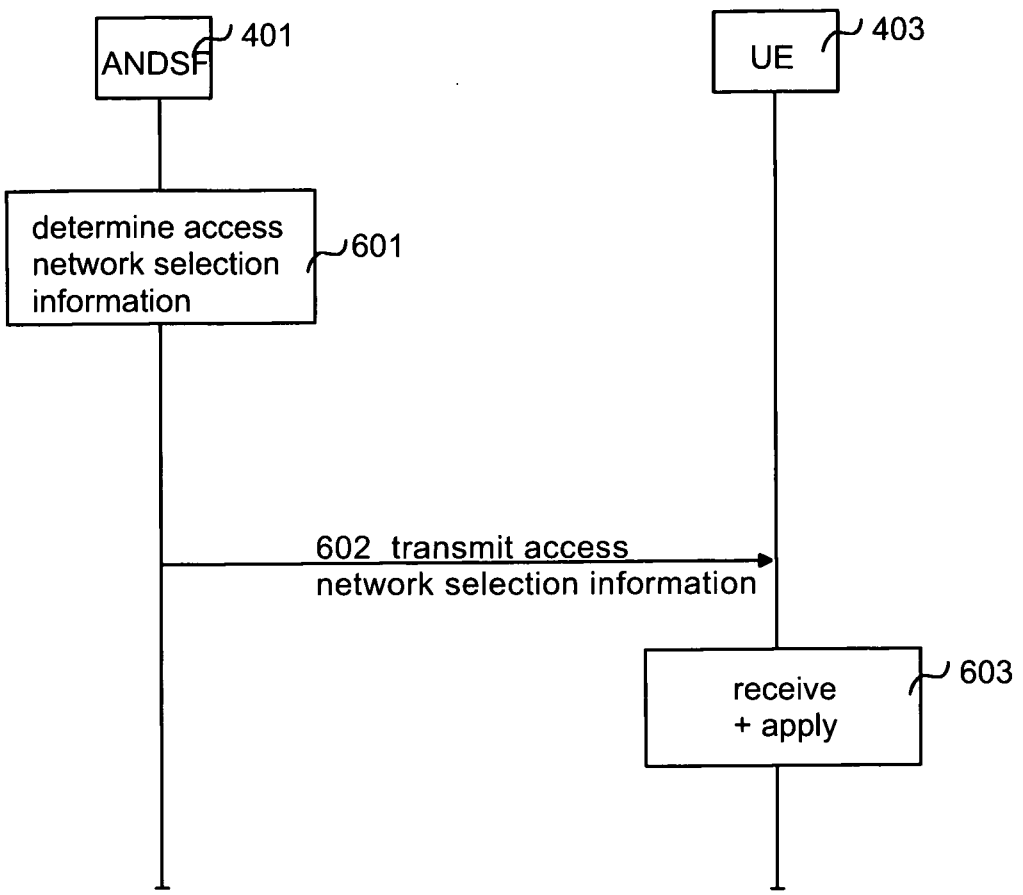
ANDSF
401
UE
403
determine access network selection information
601
602 transmit access network selection information
receive + apply
603

Fig. 6

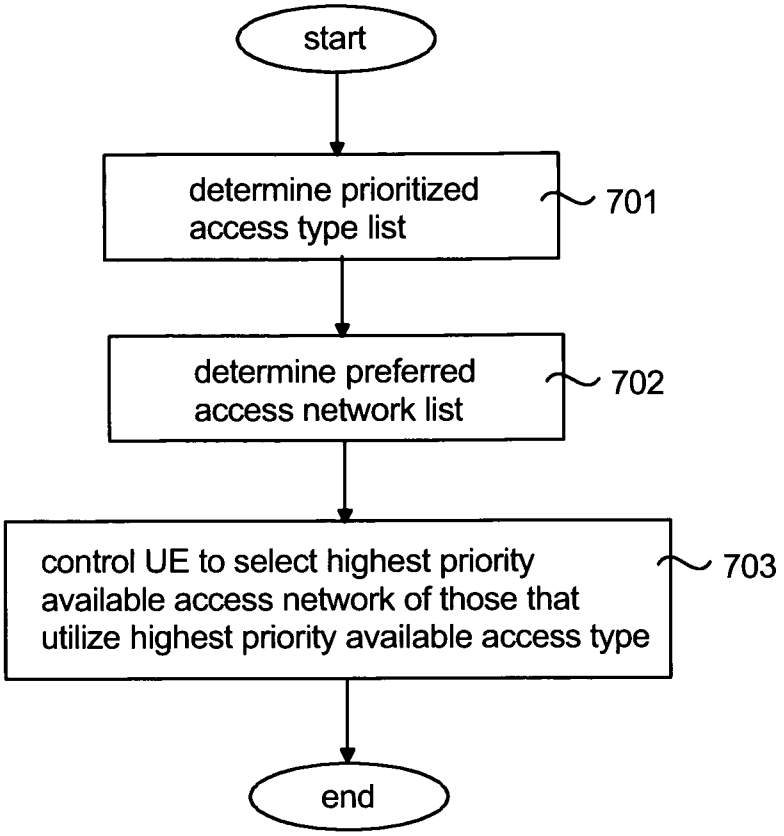
start
determine prioritized access type list
701
determine preferred access network list
702
control UE to select highest priority available access network of those that utilize highest priority available access type
703
end

Fig. 7

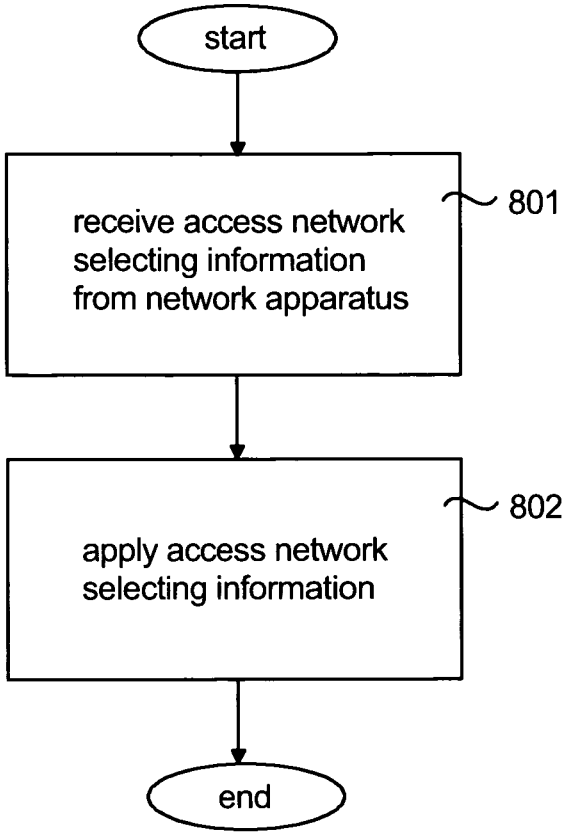
start
receive access network selecting information from network apparatus
801
apply access network selecting information
802
end

Fig. 8

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2011/000005

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04W8/18
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H04W

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, COMPENDEX, INSPEC, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	3GPP: "3rd Generation partnership Project; Technical Specification group Services and System Aspects; Architecture enhancements for non-3GPP accesses (Release 10)", 3GPP TS 23.402 V10.2.0, 17 December 2010 (2010-12-17), pages 43-51, XP002640298, Retrieved from the Internet: URL:http://www.3gpp.org/ftp/Specs/archive/23_series/23.402/ [retrieved on 2011-06-06]	1,7-10, 16-19
Y	page 45, paragraph 4.8.2.1 - page 47, paragraph 4.8.2.1	2-6, 11-15

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
13 September 2011	26/09/2011

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Rosenauer, Hubert

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Form PCT/ISA/210 (second sheet) (April 2005)

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 2006/282554 A1 (JIANG JACK Y [US] ET AL JIANG JACK YUEFENG [US] ET AL) 14 December 2006 (2006-12-14) paragraphs [0005], [0011] paragraph [0032] - paragraph [0062] paragraph [0071] - paragraph [0080] claim 5 figures 4, 8	1,9,18, 19 3,4,12, 13

Y	WO 2010/112059 A1 (NOKIA SIEMENS NETWORKS OY [FI]; FORSSELL MIKA [FI]; PARANTAINEN JANNE) 7 October 2010 (2010-10-07) page 3, line 14 - line 19 page 10, line 13 - page 11, line 11 page 14, line 4 - line 12 page 15, line 22 - page 16, line 2 page 17, line 5 - line 10 figure 1	2-6, 11-15

A	WO 2009/127238 A1 (ERICSSON TELEFON AB L M [SE]; SACHS JOACHIM [DE]; RUNE JOHAN [SE]) 22 October 2009 (2009-10-22) page 1, line 5 - line 11 page 3, line 11 - line 22 page 6, line 17 - line 22 page 6, line 28 - page 7, line 15 page 18, line 12 - line 30 page 22, line 20 - page 23, line 31 figures 2, 5, 7	1,5,6,9, 14,15, 18,19

A	NOKIA SIEMENS NETWORKS: "Non-seamless WLAN Offload Indication", 3GPP DRAFT; C1-104657, 3RD GENERATION PARTNERSHIP PROJECT (3GPP), MOBILE COMPETENCE CENTRE ; 650, ROUTE DES LUCIOLES ; F-06921 SOPHIA-ANTIPOLIS CEDEX ; FRANCE, vol. CT WG1, no. Jacksonville; 20101115, 8 November 2010 (2010-11-08), XP050465862, [retrieved on 2010-11-08] page 3, paragraph 4 figures 4.1, 4.2	1-19

T	Nokia Siemens Networks: "Correction of Inter System Routing Policy (ISRP) MO structure", 3GPP TSG CT WG1 #69, C1-110053, 28 January 2011 (2011-01-28), pages 1-6, XP002640299, Retrieved from the Internet: URL:http://www.3gpp.org/ftp/tsg_CT/WG1_mm-cc-sm_ex-CN1/TSGC1_69_Ljubljana/docs/ [retrieved on 2011-06-07] the whole document	

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2011/000005

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